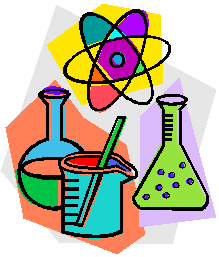
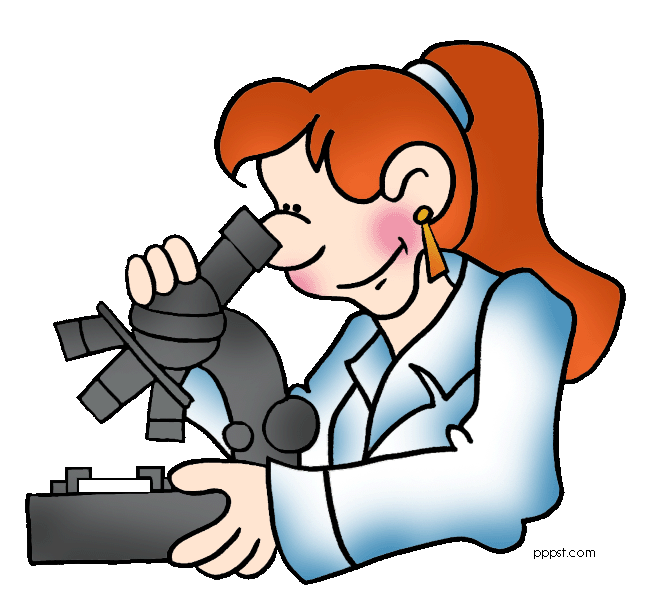
**NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_DATE\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_BLOCK\_\_\_\_\_\_**

**HOMEWORK – DUE TUESDAY, JANUARY 27th, 2009**

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**NATURE OF SCIENCE**

**UNIT REVIEW**

**Review Problem #1**

**SCENARIO: You step outside Saturday morning and glance up at the sky. Instantly, you make some observations and inferences about the weather. Please describe (“make up”) an observation and an inference that you may have made.**

**OBSERVATION-**

**INFERENCE-**

**Review Problem #2**

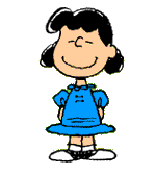
**SCENARIO: Being the science “geek” that you are, you decide to obtain some data about your kitchen. What is a quantitative measurement that you could graph? What is a qualitative measurement that you could graph?**

**QUANTITATIVE MEASUREMENT-**

**QUALITATIVE MEASUREMENT -**

**Review Problem #3**

**Lucy Van Pelt is working on a science project for school. Her task is to answer the question: "Does *Hair Wild* (**which is a commercial hair product**) affect the speed of hair growth?” Her family is willing to volunteer for the experiment (***Linus, Mrs. Van Pelt, and Mr. Van Pelt***).**

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1. **How would Lucy perform this experiment?**
2. **What is an appropriate hypothesis for this experiment?**

HINT: General Hypothesis Format - "If \_\_\_\_\_*[I do this]* \_\_\_\_\_, then \_\_\_\_\_*[this]*\_\_\_\_\_ will happen."

1. **Please identify the control, independent variable(s), and the dependent variable(s).**

**CONTROL –**

**INDEPENDENT VARIABLE(S) –**

**DEPENDENT VARIABLE(S) –**

**INTRODUCTION TO CHEMISTRY**

**Directions: Please read the following introduction.**

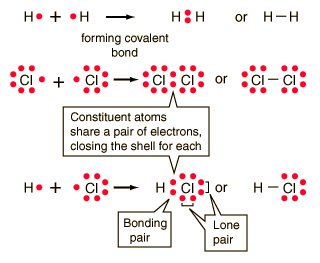
**Atoms Around Us**

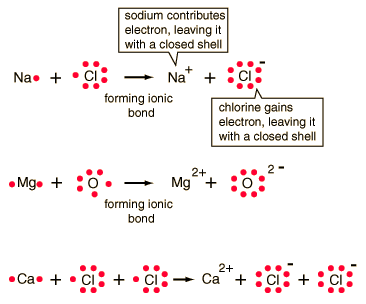
If you want to have a language, you will need an alphabet. If you want to build [proteins](http://www.chem4kids.com/files/bio_proteins.html), you will need [amino acids](http://www.chem4kids.com/files/bio_aminoacid.html). Other examples in chemistry are not any different. If you want to build [molecules](http://www.chem4kids.com/files/atom_compounds.html), you will need **elements**. Each element is a little bit different from the rest. Those [elements](http://www.chem4kids.com/files/elem_intro.html) are the alphabet to the language of molecules.   
  
Why are we talking about elements? This is the section on atoms.   
  
Let's stretch the idea a bit. If you read a book, you will read a language. Letters make up that language. But what makes those letters possible? Ummm... Ink? Yes! You need ink to create the letters. And for each letter, it is the same type of ink.   
  
Confused? Don't be. Elements are like those letters. They have something in common. That's where atoms come in. All elements are made of atoms. While the atoms may have different weights and organization, they are all built in the same way. [Electrons](http://www.chem4kids.com/files/atom_electron.html), protons, and [neutrons](http://www.chem4kids.com/files/atom_neutron.html) make the universe go.   
  
If you want to do a little more thinking, start with particles of matter. Matter, the stuff around us, is used to create atoms. Atoms are used to create the elements. Elements are used to create molecules. It just goes on. Everything you see is built by using something else.   
  
You could start really small...  
- Particles of matter  
- Atoms  
- Elements  
- Molecules  
- Macromolecules  
- Cell organelles  
- Cells  
- Tissues  
- Organs  
- Systems  
- Organisms  
- Populations  
- Ecosystems  
- Biospheres  
- Planets  
- Planetary Systems with Stars  
- Galaxies  
- The Universe  
…And finish really big.

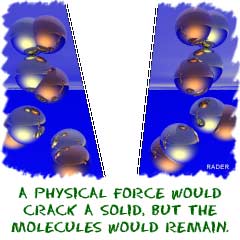
**COMPOUND BASICS**

Compounds are groups of two or more elements that are bonded together. There are two main types of bonds that hold those atoms together: **covalent and ionic bonds.**

**Covalent** compounds happen when the atoms share the electrons.



I**onic** compounds happen when electrons are donated from one atom to another.

When we talk about compounds, bonds are built and broken down by chemical forces.

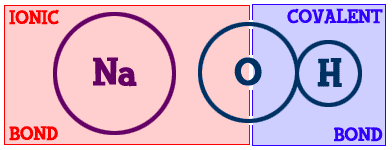
**Physical forces** (*unless you're inside of the Sun or something extreme*) cannot break down compounds.

**Chemical forces** are forces caused by other compounds or molecules that act on substances.

There are millions of different compounds around you. Chances are everything you can see is one type of compound or another. When elements join and become compounds, they lose their individual traits. Sodium alone is very reactive. But when sodium and chlorine combine, they form a non-reactive substance called sodium chloride (Salt, NaCl). The compound has none of the traits or the original elements. The new compound is not as reactive as the original elements. It has a new life of its own.

**DIFFERENT BONDS ABOUND**

Most compounds are made up of combinations of bonds. If you look at sodium chloride (NaCl), it is held together by one ionic bond. What about magnesium chloride (MgCl2)? One magnesium (Mg) and two chlorine (Cl) atoms. There are two ionic bonds. There's a compound called methane (CH4). It is made up of one carbon (C) and four hydrogens (H). There are four bonds and they are all covalent. Those examples are very simple compounds, but most compounds are combinations of ionic and covalent bonds.   
  
Let's look at sodium hydroxide (Na-OH)…



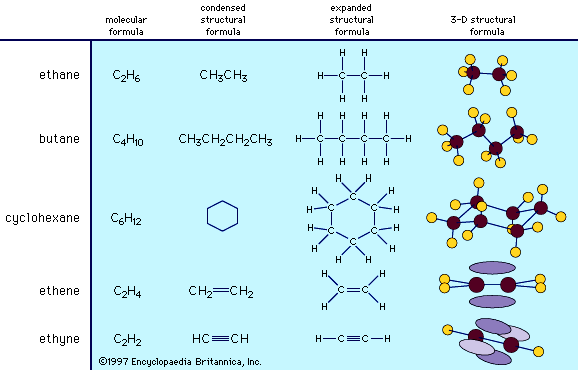
You can see that on the left is the sodium (Na) part and the right has the oxygen/hydrogen (-OH) part. The bond that binds the hydrogen (H) to the oxygen (O) is covalent. The sodium (Na) is bonded to the hydroxide part of the compound with an ionic bond. This is a very good example of how there can be different types of bonds within one compound.

**READING SOURCE: http://www.chem4kids.com/files/atom\_compounds.html**

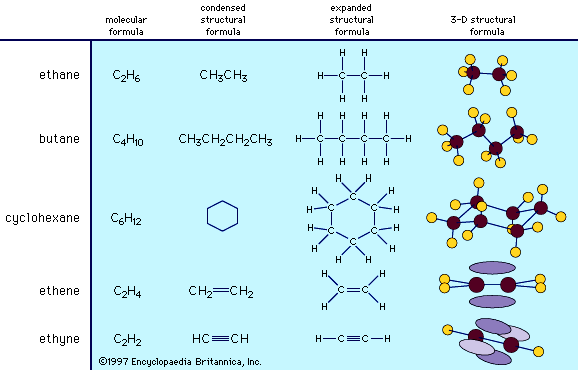
**Directions: Please answer the following questions.**

1. **Please draw a labeled picture of a carbon atom in the space provided below. (**HINT: Carbon has 2 electrons in the first shell, 4 electrons in the second shell, 6 neutrons, and 6 protons**)!**

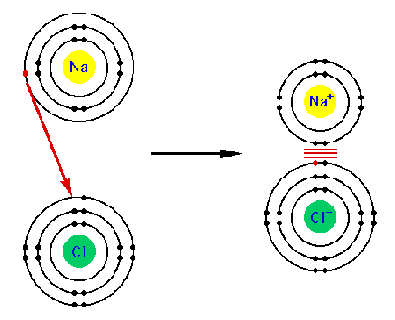
**http://www.hk-phy.org/articles/laser/c-atom\_e.gif**

1. ** We will be discussing organic compounds throughout next week – by definition, organic compounds contain carbon. The picture below shows two organic compounds (***ethane and butane***). Please describe the difference between the molecular formula and the structural formula!**

**Molecular Formula Structural Formula 3-D Structural Formula**

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1. **Please examine the diagram below showing the creation of the compound sodium chloride. When sodium and chlorine combine, is an ionic or covalent bond formed? PLEASE EXPLAIN YOUR RESPONSE!!!**

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**INTRODUCTION TO BIOCHEMISTRY**

**Directions: Please read the following introduction.**

The key thing to remember is that biochemistry is the chemistry of the **living world**. Plants, animals, single-celled organisms... They all use the same basic chemical [compounds](http://www.chem4kids.com/files/atom_compounds.html) to live their lives. Biochemistry is not about the cells or the organisms. It's about the smallest parts of those organisms, the molecules. It's also about the **cycles** that happen to create those compounds.   
  
Those cycles that repeat over and over are the things that allow living creatures to survive on Earth. It could be the constant process of **photosynthesis** in plants that creates [sugars](http://www.chem4kids.com/files/bio_carbos.html) or the building of complex [proteins](http://www.chem4kids.com/files/bio_proteins.html) in the cells of your body. Every cycle has a place and they are just one building block that helps organisms live. In each of those cycles, molecules are needed and changed. It's one big network of activity where each piece relies on all of the others.

**Source: http://www.chem4kids.com/files/bio\_intro.html**